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groups have been made, based on the data that were obtained.

LEADING metal-producing companies from all sections of the country will be represented by members of their staff at the meeting of the American Institute of Mining Engineers, which convenes in Arizona on September 18. The country's record production of metal during the past year has greatly stimulated the interest in those general mining topics which will be discussed at the institute's sessions. More than twenty corporations have already expressed a desire to be represented by institute members who may participate in the technical gathering. Some of these are Anaconda Copper Mining Co., the largest copper producing company in the country; American Smelting and Refining Co., the largest lead-producing company; Ray Consolidated Copper Co., Treadwell and Alaska Juneau mines, Miami Copper Co., and the New Jersey Zinc Co. Among the engineers who will be present are L. D. Ricketts, Benjamin B. Thayer, William L. Saunders, Sidney J. Jennings, George D. Barron and Philip N. Moore. A special train from New York will be the traveling headquarters, the train moving from point to point in Arizona each day during the week of the convention. Some seventy papers have been prepared for discussion at the meeting. These papers bear largely upon new methods of production and the mining outlook in various parts of the world.

UNIVERSITY AND EDUCATIONAL NEWS

UNDER the will of William Watson Lawrence, of Pittsburgh, Princeton University will ultimately receive the residue of his estate, estimated at more than \$750,000.

PROFESSOR CARL T. DOWELL, instructor of chemistry at the University of Texas, Austin, has been elected associate professor of chemistry at Tulane University.

THE following appointments and changes are announced from the University of Illinois:

Professor Richard C. Tolman, recently at the University of California, has been appointed professor of physical chemistry to succeed Professor E. W. Washburn, who has been appointed head of the department of ceramics. Dr. Roger C. Adams has been appointed assistant professor of organic chemistry to succeed Dr. C. G. Derick, who is organizing a research laboratory for the Schoellkopf Aniline and Chemical Works in Buffalo. Dr. Horace G. Deming, recently returned from the Philippines, has been appointed associate in chemistry to assist in the instruction in general chemistry and qualitative analysis. Professor C. W. Balke, formerly at the head of the division of general chemistry and qualitative analysis is organizing a research laboratory for the Pfanziehl Company in North Chicago which is engaged in the application of rare metals to industrial uses.

DISCUSSION AND CORRESPONDENCE

VITALISM

I HAVE read with much interest the addresses that have appeared in SCIENCE, forming part of a symposium on "The Basis of Individuality in Organisms." But I have not noted that two well-known facts, that seem to me of major importance to the discussion, have been jointly focused on the problem. May I mention them, and briefly suggest their bearing?

1. I assume all would agree that non-perceptual realities—Spencer's Unknowable, Kant's Ding-an-sich, Locke's Something, I know not what, that supports sensations—exist, and are the kernel of *all* matter, dead and living. These realities—whose natures remain so dim to our inquiries—it is that *behave* in the ways laboriously and skilfully discovered, described and formulated by natural science. Their existence and basal activity might, further, be thought to validate vitalism. For the active beings (*i. e.*, themselves) of which conscious organisms are aware are the very realities that behave after the conscious fashion, and their natures might reasonably be thought to throw light on their behavior, as has, in fact, been

the case. But such an inference goes too fast. 2. The behavior of certain groups, even when viewed phenomenally, in abstraction from their realities, as natural science views them, is different from the behavior of the aggregate of their components ungrouped; and the behavior of the components grouped is different from their behavior ungrouped; different as regards the scientific laws they observe. The proper number of electrons act differently, individually and collectively, before and after being grouped into an atom of helium. And so with the atoms that form molecules; the molecules that form cells; the cells that form organisms; the organisms that form crowds or societies.

Here, as I see it, emerges the question of the acceptance or rejection of vitalism, *as a factor in natural scientific explanation*—1, above, shows we must accept it as a fact. If it can be successfully maintained that a *full* knowledge of the *perceptual behavior* of electrons, atoms and molecules, before they are grouped and regrouped into cells and organisms, will enable us to predict their behavior, and the behavior of the cells and organisms they form, after the grouping and regrouping, then vitalism is not needed for natural scientific explanation. If not, non-perceptual realities being existent, potent and observable, in the case of conscious beings, they, and therefore vitalism, must be availed of to eke out our otherwise incomplete explanations. Of course, our present knowledge does not permit such predictions, and therefore ordinary intercourse, the social sciences, and psychology, are *per force* vitalistic in explanation, for the present at least. But the antivitalists maintain that full prediction will come some day, and that meantime we should not be scientifically—I should say natural scientifically; psychology at least is a science—satisfied till it does; while the vitalists believe our knowledge of outer perceptual happenings never will permit full prediction, though it probably will approximate more and more closely to doing so.

Whichever side is right, two facts should not be forgotten. (1) Though living cells and organisms act according to the chemical and

physical laws observed by electrons, atoms and molecules in their simpler groupings, they also, *and in addition*, behave after the higher vital fashion; *i. e.*, intelligently and any explanation offered by natural science that pretends to explain intelligence *away* is incorrect or incomplete, because false to the facts it is bound to respect. (2) The *real agents*, whose activities the sciences of nature, among others, are called upon to describe and explain, are, in the case of us men, the Egos of which we are severally confusedly conscious.

In sum, then, natural scientists, as such, must deny vitalism, in order to achieve the maximum of explanation in quantitative and phenomenalistic terms; but practical and philosophic men, viewing their problem entire, and engaged in the larger game of living, must recognize and reckon with the effective reality of the human (and animal) Ego.

I ask indulgence for the dogmatic tone, assumed in the interest of terseness; it conceals not a few modesties.

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THE ANIMAL DIET OF EARLY MAN

It may be the merest speculation to say what early man did or did not eat, but, there appears to be rather strong zoological evidence that man and his ancestors have long indulged in three forms of animal food which to-day are commonly found in markets. The perfect adaptation to their definitive and intermediate hosts and the rather high degree of differentiation of the three large tapeworm parasites of man must impress itself upon every one who gives the matter consideration and yet it is a point which I have not seen mentioned in the books on animal parasites with which I am familiar.

The tapeworms referred to are the beef tapeworm, *Tænia saginata*; the pork tapeworm, *Tænia solium*, and the fish tapeworm, *Dibothriocephalus latus*. The definitive host of the two *tænias* is man, and I believe man alone. The intermediate host of *Tænia saginata* is *Bos taurus*. The common intermediate host of *Tænia solium* is the pig, *Sus scrofa*, less